

Warmup!

Open Geogebra



1. Draw a triangle
2. Place the midpoint on two sides of the triangle



Midpoint or Center

3. Connect the midpoints with a segment

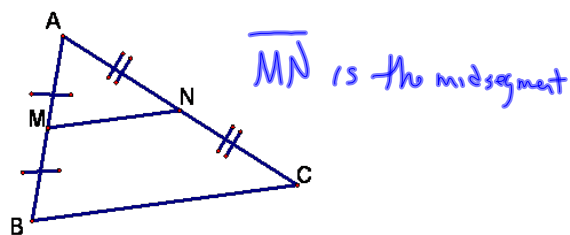


Segment

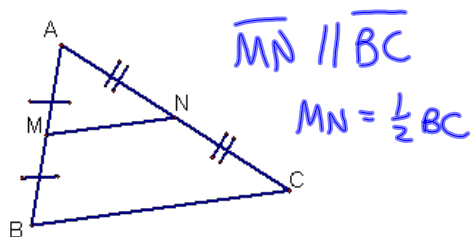
4. Measure together with teacher

5.1 Midsegment Theorem and Coordinate Proof

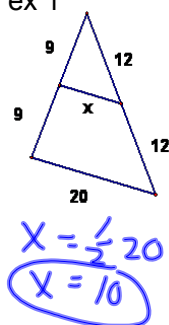
Midsegment-of a triangle is a segment whose endpoints are the midpoints of two sides of a triangle.



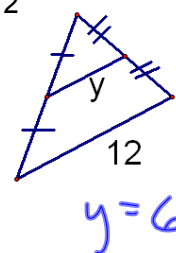
Theorem 5.1- Midsegment theorem-A midsegment of a triangle is parallel to one side of the triangle, and its length is $\frac{1}{2}$ the length of that side.



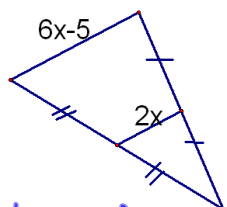
ex 1



ex 2

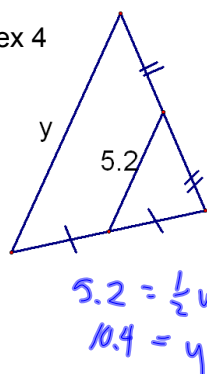


ex 3



$$\begin{aligned}\frac{1}{2}(6x-5) &= 2x \\ 6x-5 &= 4x \\ 2x &= 5 \\ x &= 2.5\end{aligned}$$

ex 4



$$\begin{aligned}5.2 &= \frac{1}{2}y \\ 10.4 &= y\end{aligned}$$

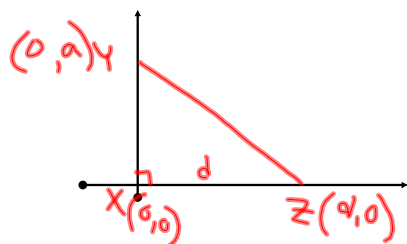
Coordinate Proof

Tips

1. Use Origin as vertex or center
2. At least one side on x-axis
3. 1st Quadrant if possible
4. Use easiest coordinates possible

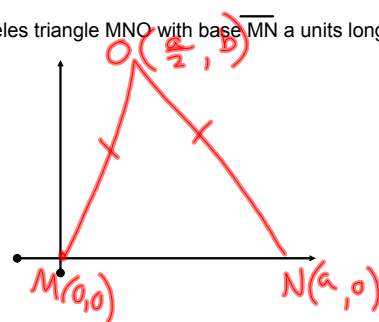
Example 5

Right triangle XYZ with hypotenuse \overline{YZ}
 $XZ = d$ units long



Example 6

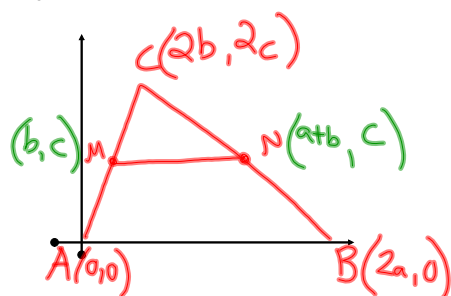
Isosceles triangle MNO with base \overline{MN} a units long



Example 7

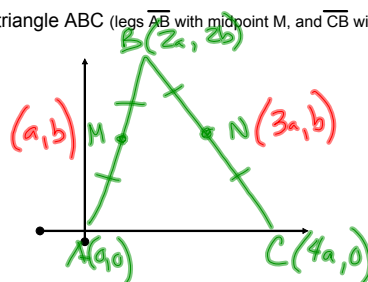
A line segment, \overline{MN} , joins the midpoints of 2 sides of $\triangle ABC$
 (When using midpoint formula, then use even numbers.)

$$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$



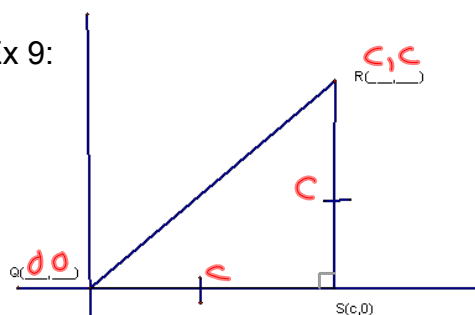
Example 8

Isosceles triangle ABC (legs \overline{AB} with midpoint M, and \overline{CB} with midpoint N)

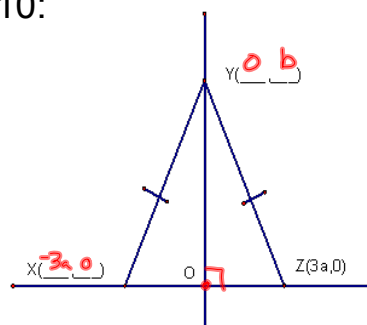


Fill in the missing coordinates.

Ex 9:



Ex 10:



Coordinate Proof

Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Slope

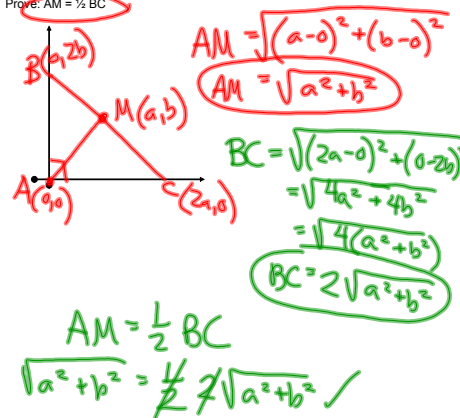
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Midpoint Formula

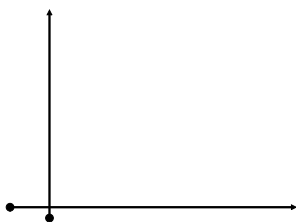
$$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

When using midpoint formula, then use even numbers.

Example

Prove that the measure of the segment that joins the vertex of a right \triangle to midpoint of the hypotenuse = $\frac{1}{2}$ the measure of the hypotenuseGiven: Right $\triangle ABC$ with hypotenuse \overline{BC} . (M is the midpoint of \overline{BC})
Prove: $AM = \frac{1}{2} BC$ 

The segments joining the vertices to the midpoints of the legs of an isosceles triangle are congruent.

Given: Isosceles triangle ABC. (legs \overline{AB} with midpoint M, and \overline{CB} with midpoint N)Prove: $AN = CM$ 

HW

Use example 7 from notes to prove the midsegment theorem and p298-299 #s 3-5, 15-19, 24